CEED
Center for Energy and Economic Development

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California Climate Action Team
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Re: Comments on the Draft Report of California Climate Action Team (December 8, 2005)

Dear Members of the California Climate Action Team:

The Center for Energy & Economic Development (CEED) submits these comments in response to the California Climate Action Team's Draft Report to Governor Schwarzenegger and the California Legislature. CEED is a non-profit organization formed by the nation's coal-producing companies, railroads, a number of electric utilities, equipment manufacturers, and related organizations to educate the public, including public sector decision-makers, about the benefits of affordable, reliable, and environmentally compatible coal-fueled electricity.

CEED and other stakeholders are fully aware that Governor Schwarzenegger has established GHG reduction "goals" for California. In response to these goals (not laws, or even regulations established pursuant to law), California has tremendous flexibility in working through state and local agencies to develop and implement cost-effective strategies. For all practical and legal purposes, however, the "performance standards" contained in ongoing policy and regulatory proceedings are an unacceptable prohibition against many types of new clean coal generation technologies. Other options exist that can serve as the basis for a thoughtful strategy to achieve California's goals.

As an active participant in recent California Public Utility Commission (CPUC) and California Energy Commission (CEC) public hearings on climate and technology issues, CEED offers these comments on the Draft Report in a desire to participate with all California agencies involved in developing a rational and responsible greenhouse gas (GHG) policy as expeditiously and cost-effectively as possible.

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At a time when the California Energy Commission acknowledges that "Energy prices in California are higher than ever before" and that California "must address its long-term electricity needs by bringing new generation on line," CEED urges the California Climate Action Team (CAT) and other California agencies to "rethink" the need for contradictory regulatory mandates like those currently being considered. Given their many social, economic, scientific, and legal implications, CEED believes that significant aspects of the CAT's Draft Report and related state agency initiatives are unnecessary, harmful to California and other western states and are unduly discriminatory against both interstate commerce and coal as a continued resource for addressing California's electric power generation needs.

I. Introduction

The draft CAT Report relies heavily upon incremental GHG emission reductions from the electric utility sector to meet the Governor's stated greenhouse gas goals—to reduce emissions to 2000 levels by 2010 and reach 1990 levels by 2020. The draft CAT recommendations for the electric power sector are divided into four program areas: improved energy efficiency programs (21 million tons), expanding renewable energy use (17.3 million tons), adopting electric sector carbon policies (11.7 million tons) and promoting combined heat & power use (4.4 million tons). Overall, the draft Climate Action Team recommendations are estimated to reduce electric power industry emissions by 55 million tons by 2020. These reductions represent roughly 30 percent of the estimated reductions needed to meet the Governor's 2020 goal.

Unfortunately, the draft report contains several serious flaws that significantly underestimate (or omit altogether from consideration) the true costs for the electric sector to reduce its GHG emissions and therefore incorrectly concludes that the estimated program savings would more than offset the costs. CEED's comments deal specifically with adopting the electric sector carbon policies (11.7 million ton reduction for an annual cost of $117 million/year) and expanding renewable power use (17.3 million tons for an annual cost of $264 million/year and $633 million/year in electric savings). Given the generic nature of the CAT's draft recommendation, it is difficult to understand how the 11.7 ton reduction was calculated.

II. The Draft CAT Report and Related "Economic Assessment" Do Not Include Any Substantive Analysis of California's Proposed GHG Performance Standards

The Draft Report's proposed electric sector carbon policies are estimated to reduce electric industry emissions by 11.7 million tons per year for an annual cost of $117 million/year. If this reduction target is met, it would account for 8 percent of the total reductions needed to reach the governor's 2020 GHG target. However, no specific electric sector carbon policy recommendations are contained in the Draft Report. As a result, the Draft CAT Report outlines only generic policy options such as emissions caps, incentives for preferred generation options and a GHG performance standard to encourage the electric sector transitioning to lower carbon alternatives.

It is difficult to understand how the policy's 11.7 million ton per year carbon reduction potential was developed. Given a lack of any substantive explanation, it appears that the estimated implementation cost of $117 million/year was simply derived by applying the "guessed" reduction potential by an undocumented $10/metric ton generic reduction cost estimate. No separate or more complete economic analyses appear to have been performed. At best the CAT approach for electric sector carbon policies provides an arbitrarily derived placeholder upon which to build future policy recommendations. At worst, and given the recent California Energy Commission Report recommendation for the development of a proposed GHG performance standard, and a forthcoming California Public Utility Commission rulemaking likely to adopt such a recommendation, the CAT's efforts do not include any consideration of such potentially expensive and unnecessary carbon control measures. Such a significant omission is striking, given the stated purpose of the CAT process is to "inform" legislative and executive review. Because the Draft CAT Report lacks any substantive assessment of implementation and economic impact issues related to potential GHG performance standards, CEED is providing the CAT with the following information. CEED respectfully requests this information be included in any revised draft or final CAT report.

A. GHG Performance Standards For New Utility Resource Procurement Have Not Been Adopted by Any California Agency, Nor Have Any Associated Potential Impacts Been Studied

The Draft Report makes only general reference to the fact that the California Energy Commission made a final recommendation that the California Public Utilities Commission adopt a GHG performance standard for its future resource decisions. At this time though, a final regulation adopting this proposed performance standard has not yet been developed. In its resolution, the CEC recommends that it "be set no looser than levels achieved by a new gas combined cycle turbine. Additional consideration is needed before determining what, if any, role GHG emission offsets should play in complying with such a performance standard."

Having not yet developed either the performance standard or qualifying offset rules, no studies (including the CAT's "Economic Assessment") have assessed its potential impact on either qualifying generation options or their respective compliance costs. The California Energy Commission and the California Public Utility Commission appear to have supported this resolution without any knowledge of its cost or effect on California's economy.

B. The Proposed GHG Performance Standards Would Significantly Reduce Available Generation Options

The challenge of adopting a performance standard based upon a new natural gas combined cycle plant is immense since such facilities' emissions can be highly variable, based upon plant location, gas turbine technology selection, loading and type of cooling technology employed. Depending upon the technology assumptions employed to develop this performance standard, a significant financial and technical risk exists that the standard may exclude combined cycle plant applications in higher elevations, smaller size facilities, facilities employing air cooled options or plants that are not used as baseload power sources.

More importantly, "GHG performance standards" like that recommended by the CEC will exclude a major portion of the existing California generating resources used today. California has over 17,800 MW of in-state oil/gas fired steam capacity and large amounts of additional gas peaking turbine capacity that are unable to achieve combined cycle efficiencies and could not meet the standard. Similarly, the low cost coal-fired generation or biomass generation facilities that accounted for nearly one quarter of the state's 2004 electric supplies would also be excluded. ***Overall roughly 40-45% of the 2004 California generation came from facilities that would be unable to meet a combined cycle based GHG performance standard.*** To replace this output with capacity able to meet an arbitrary performance standard would likely require a capital investment alone of over $30 billion. Large amounts of California's investment in its existing generation fleet could be lost and California would likely become increasingly dependent upon costly natural gas and nuclear power to meet its future power needs.

The draft CAT Report must be revised to recognize that the outlook for new generation technologies able to comply in the near term with the CEC's recommended combined cycle based performance standard is very poor. All gas peaking turbines, advanced clean coal technologies, biomass-fired facilities and oil-fired alternatives would be excluded. Gas peaking turbines would be far less efficient (and therefore higher carbon emitting) than the combined cycle alternative. Its inconceivable carbon containing fuels such as biomass, petroleum coke, coal, waste coal and oil can offset their higher fuel carbon content without any energy efficiency advantage (often a disadvantage) over the gas combined cycle standard. Therefore, to comply with these fuel options, suppliers must find cost-effective methods to capture CO_2 emissions from their flue gas streams and store/sell it.

C. CO_2 Capture And Sequestration Technologies Needed To Reach Performance Goals For Most Fuel Options Are Extremely Expensive

Unfortunately, the current CO_2 capture/sequestration technology to reach the CEC's performance goal is highly energy intensive and far too expensive. Currently, there are only four powerplants in the US that capture a small portion of CO_2 from their flue gas streams. These facilities use a MEA reagent based scrubber to capture up to 90 percent of CO_2 from the treated flue gas streams. In most cases, the recaptured CO_2 is then compressed to produce a product that can be sold or injected for sequestration. Overall, to treat 100 percent of the flue gas would require roughly 75 percent of the plant's total output energy. However, to capture only the amount of CO_2 needed to meet a gas combined cycle emission rate (per MWh unit output basis) would consume roughly 63 percent of the plant output energy. Cost to capture and compress CO_2 would increase the production cost of coal-based electricity using conventional PC and CFB technologies by 184%. To treat the coal-fired generation currently coming into California alone would cost more than $5 billion/year. This is far greater than the undocumented and arbitrary CAT $117 million estimate. Such costs would make higher carbon containing fuel alternatives far more costly than nuclear power and gas combined cycle alternatives that do not incur the

carbon penalty. As such, California would necessarily have to become greatly dependent upon nuclear power and high cost natural gas for its energy needs.[1]

D. IGCC Technology With Carbon Sequestration Is Not a Viable Alternative

The California Energy Commission report suggests that a coal-based Integrated Gasification Combine Cycle (IGCC) technology in combination with CO_2 capture and sequestration may offer a future alternative generation option able to achieve this performance standard. Unfortunately, this option is also unlikely to become economic within the governor's GHG goal timetable.

While IGCC technology has an advantage versus pulverized coal technology alternatives in terms of being able to remove CO_2 in the syngas stream before combustion using less costly conventional gas separation technologies, this advantage is limited to only a small portion (<20%) of the CO_2 created. The vast majority of the CO_2 is created when the syngas is subsequently combusted in the combined cycle power facilities. This carbon dioxide can only be removed using the much higher cost CO_2 scrubbing technologies. Roughly 42% of the energy output is lost for CO_2 capture and compression. Overall, the cost for a current IGCC plant to capture and store sufficient CO_2 to equal a gas combined cycle performance rate would cost California ratepayers an additional 10c/kWh. Current IGCC technologies with carbon sequestration are not cost competitive versus nuclear and natural gas combined cycle options.[2]

With future research, DOE hopes to improve the energy efficiencies of both IGCC and carbon capture/sequestration technologies. If their technology performance targets are met, the advancements could reduce the energy consumption and production cost and allow coal-based alternatives to become more cost-competitive. However, these improvements may take several years to reach and may not be available during the governor's 2020 GHG target timeline.

III. The CAT's Proposal To Expand California's Renewable Portfolio Standard Is Based Upon Erroneous Cost Assumptions That Will Have Significant Western Resource Implications

CEED is concerned with the CAT's assumptions regarding increased utilization of renewable power generation sources as a "substitute" for coal-fueled generation. This assumption is a misconception because coal-fueled generation and most renewable generation are not dispatched the same. Coal-fueled generation provides baseload electricity while the renewables included in the CAT, specifically wind, provides variable electricity. Baseload generation runs consistently and is dispatched as firm power because of this attribute. Wind and solar based renewable generation provide electricity intermittently and is dispatched accordingly. Specifically, the CAT recommendations are estimated to yield 17.3 million tons in additional

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[1] At current (2005) average fuel prices, coal-fired power is $13.20/Mwh vs. $54-79/Mwh for oil and gas steam combined cycle units.

[2] Research conducted by Tom Hewson, Energy Ventures Analysis, Inc. (January 24, 2006).

CO_2 reductions or roughly 12 percent of the governor's reduction goal. Their renewable recommendations include: adopting a renewable portfolio standard of 33 percent (currently 20% for investor owned utilities only); and installing solar panels on one million roofs. According to the draft CAT report, to reach the expanded renewable goals would cost $264 million/year to implement but yield $633 million in annual electric savings (mostly from solar use).

Under the draft CAT's proposal, the already aggressive 20 percent renewable portfolio requirement (60-70 TWh by 2020) in California should be raised to 33 percent. If adopted, such a requirement would result in California purchasing an additional 54 TWh more of renewable power by 2020 and cost ratepayers an estimated $124 million/year ($2.44/MWh) more in power procurement costs.

Surprisingly, the referenced California Public Utility Commission report entitled *Achieving a 33% Renewable Energy Target* (November 2005) did not study the impact of this expansion in combination with other Western state renewable portfolio standards on Western renewable resources or renewable production costs. Four Western states (Arizona, Colorado, New Mexico, Nevada) have also adopted renewable portfolio requirements totaling 20 TWh by 2020 that had planned to draw upon these same renewable resources. Other western states are also considering adopting similar standards that would push demand above 140 TWh. Based upon CEED's preliminary assessment, CEED has found no evidence that these combined demands can be met at the costs assumed by the California PUC.

The CPUC's report assumes that the vast majority of additional renewable power will be derived from wind power. Given this assumed dependence, CEED believes that a closer examination and discussion of wind power production costs is required.

- Capital Cost Will Decline to $663/kw: The CPUC report employs a total capital cost of $1,020/kW in 2005 and assumes that it will decline to $663/kW by 2017. The CPUC assumed 2005 wind capital cost is 23% less than the 2005 average reported wind project cost of $1,331/kW. The implications of the CPUC's lower starting point and 35% reduction in capital cost due to technology improvements appear to have significantly underestimated the wind capital investment costs necessary to build the 7,608 MW of projected needed new wind capacity. Unfortunately, the entire Western renewable demand will likely lead suppliers to develop more remote sites with higher capital costs, so capital costs could increase, not decline. Since capital cost recovery is the single largest production cost component, the CPUC's lower capital cost assumption underestimates the true cost of wind power.

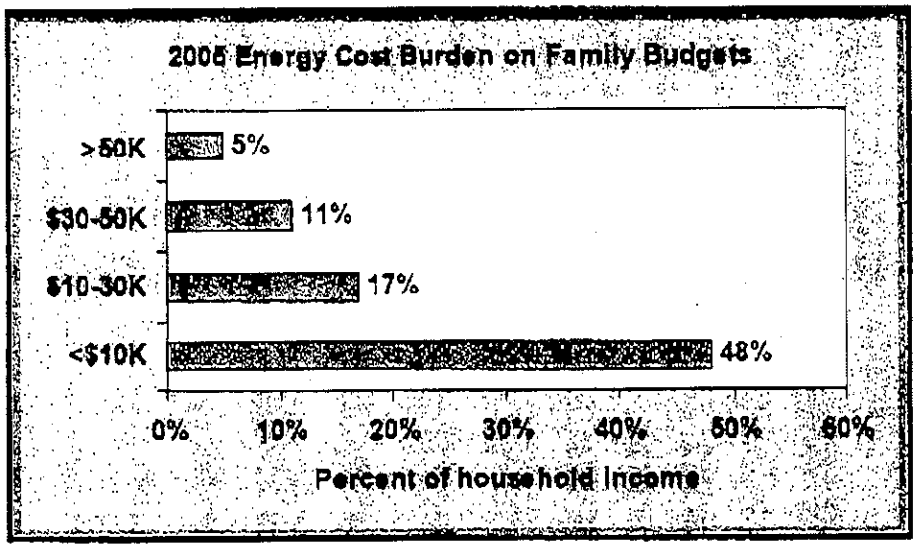
- Wind Capacity Factors will increase from 37 percent to 43 percent by 2017: According to the U.S. Department of Energy 906 data, only one California wind project and eight projects in the entire nation report such a high capacity factor, as has been assumed in the CPUC analysis for "high speed wind resource-2005". This same non-representative assumption has also been applied for the low speed wind resource areas that will be required to meet the combined Western

renewable demand load. With the average 2003 California capacity factor less than 23 percent and the outlook for developing poorer wind resource areas, the CPUC study assumption of 37 to 43 percent may vastly over-estimate the potential wind power contribution and significantly underestimate the wind production cost.

The combination of the lower capital costs and significant improvement in wind production performance led the CPUC report to conclude that wind power production costs would decline to $33/MWh. This represents half of their estimated 2005 production costs that are far less than the California actual costs. Because the true costs associated with additional wind power generation are far higher, the Draft Report must be revised to account for this data.

IV. The Draft CAT Report Must Be Revised To Promote The Availability of More Affordable Energy

As indicated above, the Draft CAT recommendations rely upon a large assumed expansion of reliance on renewable energy sources (particularly wind). CEED opposes state regulations that place coal at an unjustified disadvantage to other fuels used for generating electricity. Higher energy prices disproportionately affect families living on lower and fixed incomes. Thus, we all have a stake in keeping energy costs affordable. Less money spent on electricity means more money is available for housing, food, education, and other necessities that improve our quality of life. Therefore, it is an unwise and unjust policy to raise energy prices so that consumers use less.



The often overlooked truth is that the burden of increased energy costs falls hardest on those least able to pay.

Consider the following facts that are based on an analysis of the effects of 2005 prices for residential and transportation energy according to data from the U.S. Department of Energy's

Energy Information Administration, the U.S. Bureau of the Census, and the U.S. Department of Transportation:

Energy Cost Burdens on American Families:

- In 2005, energy costs will consume 48 percent of the budgets of U.S. families with incomes of less than $10,000.
- The 29 million U.S. households with incomes of $10,000 to $30,000 (averaging $19,700) will spend 17 percent of their pre-tax income on energy products and services in 2005.
- Overall, the 56 percent of American families with incomes of $50,000 or less (totaling 63 million families) will spend 20 percent of their pre-tax income on energy in 2005.
- Households with family incomes greater than $50,000 will spend five percent of their gross incomes for residential and transportation energy.

See, "Energy Cost Burdens on American Families – Americans are Feeling the Pinch of Skyrocketing Energy Prices" Eugene Trisko, 2005. **(Exhibit A)**

It is now widely recognized that wealthier individuals are more likely to live safer, healthier, and longer lives. With more income, individuals tend to spend more on health care for themselves and their children, purchase more safety equipment, eat a more nutritious diet, and take other actions that decrease the likelihood of premature death by illness or accident. Consistent with this fact, individual reductions in disposable income tend to increase health and safety risks and the resulting deaths. Similarly, higher unemployment has been shown to have an adverse effect on safety, health, and longevity.

When regulations are enacted with the intent of reducing certain life-threatening risks, we expect to see benefits in the form of safer, healthier, and longer lives. But at the same time, the economic costs of these regulations – particularly the impacts on income and employment – can *worsen* individual health or safety and shorten lifetimes. A key issue is whether net benefits or net losses in health and safety result from these opposing forces. *See,* "Mortality Reductions From Use of Low-Cost Coal-Fueled Power: An Analytical Framework," Daniel Klein and Ralph Keeney, 2002. **(Exhibit B)**

The Klein-Keeney study sets forth a framework for analyzing the induced adult deaths that could arise from the higher costs of forgoing the use of low-cost coal-fueled power. These potential losses are the health, safety, and longevity gains that coal-fueled power now provides. The study analyzed several energy and economic modeling studies that calculated the costs of significant reductions in coal-fueled power. The study allocated these costs to different income groups, and then estimated the expected number of adult deaths that would be induced by this loss of income. *See* attached.

Additional research, by John Hopkins Professor Harvey Brenner, Ph.D., was recently published in the *Air and Waste Management Journal* and drives home the point that higher energy prices directly impact health and mortality of California residents. Dr. Brenner

developed an econometric model and applied a hypothetical regulatory case study, whereby, as the Climate Action Team recommendations will foster, U.S. coal was replaced by alternative higher-cost fuels such as natural gas for the purpose of electricity generation. The model was used to estimate the premature mortality associated with increased unemployment and reduced personal income. The adverse impacts on household income and unemployment due to the substitution of higher-cost energy sources across the U.S. were estimated to result in 195,000 additional premature deaths annually. If California was likewise modeled, it is expected the consequences of implementing the recommendations of the Climate Action Team will be similarly demonstrable and most unfortunate. *See*, "Health Benefits of Low Cost Energy, An Econometric Case Study" Harvey Brenner, Ph.D. 2006, *Air and Waste Management Journal.* **(Exhibit C)**

CEED urges the CAT to account for these considerations in developing any further policy recommendations to the governor or legislature.

V. Recommendations — The CAT Report Should be Substantially Revised to Contain More Accurate Data and to Promote All Manner of Economically Feasible Clean Coal Technologies

CEED requests that the CAT's efforts take into account the information supplied by CEED and other stakeholders, as it refines its analysis. Accurate information is essential to the future legitimacy of any final CAT Report. In this regard, CEED also submits the January 2005 Report of the Coal-Based Generation Stakeholders Group (CBGS) entitled "A Vision for Achieving Ultra-Low Emissions from Coal-Fueled Electric Generation." **(Exhibit D)** The CBGS Report documents the following key points, which are germane to California's need for refining the approach contained in the current Draft Report:

- Coal is a fuel of the present;
- Coal must remain a significant fuel of choice in the future;
- Advances in technology will ensure continued coal use while addressing the concerns about the environment;
- New technologies will lead to ultra-low emission levels; and
- A vision and pathway exist to achieve these results.

The "vision document" was finalized after much research and industry discussion. It was designed to ensure that federal and state policymakers know the facts about the state of coal-generation technologies and industry activities to: 1) enable use of our nation's strategically important coal reserves, 2) achieve ultra-low emissions from electricity generation and reduce CO_2 intensity, and 3) protect consumers from unnecessarily high electricity costs. Under the pathway identified in the CBGS document, these three goals can be met on a reasonable timeline dictated by the availability of the technology and as research and demonstrations are completed.

As a CBGS member, CEED concurs that many new coal gasification technologies can represent the next generation of coal-fueled generation. It is critical for the CAT to recognize, however, that these technologies require further development and demonstration. As such, it is

improper for California to require these technologies be used today, either directly or as the basis for measuring the acceptability of emissions offsets against existing clean coal technologies.

CEED respectfully requests that this letter and all attachments hereto be incorporated into the California Energy Commission CAT's administrative record for this matter. We hope this information is helpful to the CAT and will be made part of any revised CAT strategies.

Sincerely,

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